International Journal of Innovative Research and Advanced Studies (IJIRAS)
Volume 5 Issue 4, April 2018

ISSN: 2394-4404

Administration Of Criminal Justice And Role Of Forensics In India: A Study

Dr. (Mrs.) Seema Kashyap

Assistant Professor In Law At Himachal Pradesh University Institute Of Legal Studies, Ava-Lodge Campus, Chaura Maidan, Shimla, Himachal Pradesh

Anirudh Sood

Student, Ll.M. 4th Sem., Department Of Laws, Himachal Pradesh University, Summerhill, Shimla, Himachal Pradesh

Abstract: ***With an increase in crime rate, the need to administer instant justice to the victims of the crime and their families is becoming the foremost duty of the Criminal Justice System. The infusion of technology in crime investigation has been a major breakthrough in the process of advancement of criminal justice. Police utilize scientific tools and techniques to detect a crime, reconstruct the crime scene, identify the alleged offender and establish vital links; the courts, on the other, take account of these physical evidences, otherwise infallible, and determine with enhanced accuracy the innocence or guilt of the offender. Somewhere, the efficiency and effectiveness of the criminal justice functioning has come to be intertwined with the extent of use of technological tools in crime investigation. Thus, to administer time bound justice and to punish a criminal is the most important duty of the court. The growing significance of science and its application in crime investigation has paved an easier path for scientific investigation and administering justice in the right place and at the right time. For every case that is being tried in the court of law, scientific evidence is required to prove the innocence of the suspect or to punish him according to the law. To make the task easier, the Criminal Justice System is looking towards giving scientific conclusions to cases and the branch of science which is helping in the application of scientific principles for effective administration of Criminal Justice system is called Forensic Science. Forensic science is a multidisciplinary science which helps in proving cases with scientific evidences. Evidence recovered from a crime scene tells its own tale and leads the investigator to the victim, suspect or people involved in the crime. A bloodstain, a seminal stain in sexual assault, a forged signature in document, a hair sample, skeletal remains recovered from crime scene, a morphed photograph, a fired weapon, a broken glass, a narcotic drug, a visceral sample collected after autopsy, a fingerprint on a tea cup found in the crime scene and many more evidences can help the police reach the suspect. This utility has been applied in various legal systems worldwide; wherein scientific evidence such as DNA helps the courts to decide complicated high-tech crime cases. Scientific evidence such as DNA is a tool used to ascertain the guilt or innocence of suspect with certainty when evidence such as blood, semen have been left at crime scene. It plays a duo role either to exonerate individual falsely accused or convict those guilty of crimes. DNA evidence is normally used to resolve criminal case in various ways. The first scenario is when the suspect is known and DNA sample collected from him/her is compared from the DNA sample collected from the scene of crime to ascertain the involvement of suspect in commission of crime. The second one is when the suspect is unknown but he/she leaves the biological evidence at the crime scene where these evidence can be analysed and compared with perpetrator's DNA profile from DNA database to establish his/her identity. Moreover, through the use of DNA profile from database, DNA evidence collected from crime scene when the originator is unidentified be utilised to link other already committed crimes. In these circumstances, DNA technology is increasingly vital to safeguard correctness and objectivity in crime solving. This research paper focuses on the significance of Forensic Science in effective administration of Criminal Justice system in India.***

I. INTRODUCTION

The term "Forensics" is derived from the Latin word 'forensis' which means belonging to courts of justice or to public discussion and debate. 'Forensic Science' would, therefore, mean the science which is used in the courts of justice. It can be defined more broadly as that scientific discipline which is directed to the recognition, identification,

individualization and evaluation of physical evidence by the application of the principles and methods of natural sciences for the purpose of administration of criminal justice.

The ancient world lacked standardized forensic practices, which aided criminals in escaping punishment. Criminal investigations and trials relied on forced confessions and witness testimony. However ancient sources contain several accounts of techniques that foreshadow the concepts of forensic science that is developed centuries later, such as the "Eureka" legend told of Archimedes (287–212 BC).1 In ancient India too, medical opinion was frequently applied to the requirements of the law. By law the minimum age for the marriage of girls was fixed at 12 years; the duration of pregnancy was recognized as being between 9 and 12 lunar months with an average of 10 months and there is evidence that doctors had to opine on such cases. Sir William Herschel was one of the first to advocate the use of fingerprinting in the identification of criminal suspects. While working for the Indian Civil Service, he began to use thumbprints on documents as a security measure to prevent the then-rampant repudiation of signatures in 1858. In 1877 at Hooghly (near Calcutta) he instituted the use of fingerprints on contracts and deeds and he registered government pensioners' fingerprints to prevent the collection of money by relatives after a pensioner's death. Herschel also fingerprinted prisoners upon sentencing to prevent various frauds that were attempted in order to avoid serving a prison sentence.

In 1897 a Fingerprint Bureau was established in Calcutta (Kolkata), India, after the Council of the Governor General approved a committee report stating that fingerprints should be used for the classification of criminal records. Working in the Calcutta Anthropometric Bureau, before it became the Fingerprint Bureau, were Azizul Haque and Hem Chandra Bose. Haque and Bose were Indian fingerprint experts who have been credited with the primary development of a fingerprint classification system eventually named after their supervisor, Sir Edward Richard Henry. The Henry Classification System, co-devised by Haque and Bose, was accepted in England and Wales when the first United Kingdom Fingerprint Bureau was founded in Scotland Yard, the Metropolitan Police headquarters, London, in 1901. Sir Edward Richard Henry subsequently achieved improvements in dactyloscopy. In 1968, the Ministry of Home Affairs, Government of India, set up a Forensic Science Laboratory for Delhi Police and the Central Bureau of Investigation under the administrative control of the Central Bureau of Investigation. This laboratory now provides expert opinion on various aspects of Forensic Science concerning crime investigation. Apart from Delhi Police and the CBI, it also provides assistance to the Central Government Departments, State Forensic Science Laboratories, Defense Forces, Government Undertakings, Universities, and Banks etc. in criminal cases. The laboratory has are search and development set up to tackle special problems. The expertise available at the CFSL is also utilized in teaching and training activities conducted by the CBI, Lok Nayak Jai prakash Narayan, National Institute of Criminology & Forensic Sciences, Police Training Institutions, Universities and Government Departments conducting Law Enforcement Courses etc.

In the 19th century, it was discovered that almost any contact between a finger and a fixed surface left a latent mark that could be made visible by a variety of procedures (e.g., the use of a fine powder). In 1894 in England the Troup Committee, a group established by the Home Secretary to determine the best means of personal identification, accepted that no two individuals had the same fingerprints—a proposition that has never been seriously refuted. In 1900 another committee recommended the use of fingerprints for criminal identification. Fingerprint evidence was first accepted in an Argentine court in the 1890s and in an English court in 1902. Many other countries soon adopted systems of fingerprint identification as well.

Today the modus operandi of high-tech crime is very complex in the modern scientific era. Advances in science and technology applied in real life must be met and regulated with laws, especially in the administration of criminal justice. The main purpose of every legal system is to protect human life and property and to promote peace and harmony in social life. Thus, it is essential to enhance techniques of crime detection in order to decrease crime and consequently preventing breach of the law. Genetic evidence such as DNA can be employed in investigation and to establish occurrence of crime and guilt of perpetrators. Legal, socio-economic, political changes and technological advances happening in various countries affect and change the way societies live. The quick development of science and technology in Information Technology and Forensic Science is likewise leading to the need of reviewing and updating some penal laws. Investigation involves several stages and the crime scene visitation is one of the most important of them, excluding perhaps, white-collar crimes. Recognizing this need, the Police Manuals in most of the States have mandated immediate dispatch of an officer to the scene of crime for inspecting it, preserving the evidence and preparing the site plan etc. Such inspection of scene crimes should be done by a team consisting of forensic scientist, finger print experts, crime photographer, legal advisor etc., and not just by a single investigating officer. In the National Seminar on “Forensic Science”: Use and Application in Investigation and Prosecution” held on 27 July 2002, at Hyderabad held under the auspicious of this Committee in which Judges, senior police officers, senior forensic scientists and Medical Jurists had participated, the forensic scientists lamented that their services were not being utilised for crime scene visitation as a result of which valuable forensic evidence is being lost.

WHAT IS FORENSIC SCIENCE?

The concept of forensic science is not a new one. In ancient India, medical opinion was frequently applied to the requirements of the law. Sir William Herschel was one of the first to advocate the use of fingerprinting in the identification of criminal suspects. Fingerprint evidence was first accepted in an Argentine court in the 1890s and in an English court in 1902. Forensic evidence is a discipline that functions within the parameters of the legal system. Its purpose is to provide guidance to those conducting criminal investigation and to supply to courts accurate information upon which they can rely in resolving criminal and civil disputes.

Forensic science, an amalgamation of almost all faculties of knowledge, is an essential and efficient enabler in the dispensation of justice in criminal, civil, regulatory and social contexts. It is defined as the application of science in answering questions that are of legal interest. Forensic science in today's world is an advanced scientific technique which is used in criminal and civil investigations, it is capable of answering important questions and forms an integrated part of criminal justice system5. It includes all well known techniques such as fingerprint analysis, DNA analysis, ballistic, firearms or explosive culture etc. It helps to convict those guilty of crime as well as can exonerate the innocent.

ROLE OF FORENSIC SCIENCE IN CRIME INVESTIGATION

Forensic science is one of the important aspects of criminal justice. Basically, it deals with scientific examination of physical clues collected from the crime scene. Forensic science explains the identity (who) of the suspect who committed the crime. The evidence clearly indicates the type (what) of the crime committed. The circumstances speak out about the time (when) of the incident. The forensic evidence proves the location of the offence (where/crime scene).The forensic investigation finds out the modus operandi (how) of the offender. Lastly, it establishes the motive behind the crime. The forensic investigators reconstruct identity of the offender and the victim. During an investigation, evidence is collected at a crime scene or from a person, analyzed in a crime laboratory and then the results presented in court. Each crime scene is unique, and each case presents its own challenges. Forensic science plays a vital role in the criminal justice system by providing scientifically based information through the analysis of physical evidence, the identity of the culprit through personal clues like fingerprint, footprints, blood drops or hair. It links the criminal with the crime through objects left by him at the scene and with the victim or carried from the scene and the victim. On the other hand, if the clues recovered do not link the accused with the victim or the scene of occurrence, the innocence of the accused is established. Forensic science, thus, also saves the innocent. After the emergence of DNA technology as a latest method of forensic science, it provides tremendous amount of information to the investigating officers that enable him to find the criminal purely from evidence which he has left at the scene of crime.

INDIAN LAW AND FORENSIC SCIENCE

In India, the application of forensic science to crime investigation and trial has to stand the limitation of law. The predominant questions therein are:

- ✓ What is the constitutional validity of such techniques?
- ✓ To what extent does the law allow the use of forensic techniques in crime investigation?
- ✓ What is the evidentiary value of the forensic information obtained from the experts?

Articles 20(3) of the Indian Constitution provides that no person accused of any offence shall be compelled to be a witness against himself. Article 20(3) is based upon the presumption drawn by law that the accused person is innocent till proved guilty. It also protects the accused by shielding him from the possible torture during investigation in police custody. Criminal law considers an accused as innocent until his guilt is established beyond reasonable doubt. The Universal Declaration of Human Rights, Article 11, states: "Everyone charged with a penal offence has the right to be presumed innocent until proved guilty according to law in a public trial at which he has had all the guarantees necessary for his defence." Article 20 (3) of the Constitution of India guarantees fundamental right against self-incrimination and guards against forcible testimony of any witness. The fundamental right guaranteed under Article 20 (3) is a protective umbrella against testimonial compulsion in respect of persons accused of an offence to be witness against themselves. The protection is available not only in respect of evidence given in a trial before Court but also at previous stage. The protection against self-incrimination envisaged in Article 20 (3) is available only when compulsion is used and not against voluntary statement, disclosure or production of document or other material. This right has been taken to ensure that a person is not bound to answer any question or produce any document or thing if that material would have the tendency to expose the person to conviction for a crime.

Sec. 73 of the Indian Evidence Act empowers the court to direct any person including an accused to allow his finger impressions to be taken. The Supreme Court has also held that being compelled to give fingerprints does not violate the constitutional safeguards given in Art. 20(3). There are questions as to whether forensic evidence violates Art. 20(3) of Indian Constitution or not?

In State of Bombay v. Kathi Kaluoghad & Others, the court held that giving thumb impression, specimen signature, blood, hair, semen etc. by the accused do not amount to 'being a witness' within the meaning of the said Article. The accused, therefore, has no right to object to DNA examination for the purposes of investigation and trial.

The Bombay High Court in another significant verdict in the case of, Ramchandra Reddy and Ors. v.State of Maharashtra, upheld the legality of the use of P300 or Brain finger-printing, liedetector test and the use of truth serum or narco analysis. The court upheld a special court order allowing SIT to conduct scientific tests on the accused in the fake stamp paper scam including the main accused, Abdul Karim Telgi. The verdict also maintained that the evidence procured under the effect of truth serum is also admissible. In a 2006 judgment, Dinesh Dalmia v State, the Madras High Court held that subjecting an accused to narco-analysis does not tantamount to testimony by compulsion. However, in a subsequent case, i.e., Selvi & Ors v. State of Karnataka & Anr., the Supreme Court questioned the legitimacy of the involuntary administration of certain scientific techniques for the purpose of improving investigation efforts in criminal cases. In the above mentioned case, the Supreme Court held that brain mapping and polygraph tests were inconclusive and thus their compulsory usage in a criminal investigation would be unconstitutional.

The Code of Criminal Procedure, 1973 was amended in 2005 to enable the collection of a host of medical details from accused persons upon their arrest. Section 53 of the Criminal

Procedure Code 1976 provides that upon arrest, an accused person may be subjected to a medical examination if there are "reasonable grounds for believing" that such examination will afford evidence as to the crime. The scope of this examination was expanded in 2005 to include "the examination of blood, blood-stains, semen, swabs in case of sexual offences, sputum and sweat, hair samples and finger nail clippings by the use of modern and scientific techniques including DNA profiling and such other tests which the registered medical practitioner thinks necessary in a particular case." However, the provision inserted through an Amendment in 2005 is limited to rape cases only. This section also does not enable a complainant to collect blood, semen, etc, for bringing criminal charges against the accused; neither does it apply to complaint cases. In similar lines, section 164A Code of Criminal Procedure, 1973 provides for the medical examination of a woman who is an alleged victim of rape within twenty four hours and such examination includes the DNA profiling of the woman. Both the sections authorize any medical practitioner within the meaning of Sec. 2(h) Indian Medical Council Act, 1956 to collect a DNA sample. Question lies as to whether every medical practitioner is capable to collect and preserve DNA evidence. It is a well known fact that DNA evidence is entirely dependent upon proper collection and preservation of sample. Any simple mistake or unawareness can contaminate the sample and contaminated sample is of no use.

Under Indian Evidence Act, 1872, forensic report is considered as "opinion" tendered by expert. An expert may be defined as a person who, by practice and observation, has become experienced in any science or trade. He is one who has devoted time and study to a special branch of learning, and is thus especially skilled in that field wherein he is called to give his opinion. The real function of the expert is to put before the court all the materials, together with reasons which induce him to come to the conclusion, so that the court, although not an expert, may form its own judgment by its own observation of those materials. The credibility of an expert witness depends on the reasons stated in support of conclusion and the tool technique and materials, which form the basis of such conclusion. However, the court is free to disagree with the conclusions drawn by the expert and rely on other evidences for the purpose of decision. The National Draft Policy on Criminal Justice Reforms has suggested that Indian Evidence Act needs to be amended to make scientific evidence admissible as 'substantive evidence' rather than 'opinion evidence' and establish its probative value, depending on the sophistication of the concerned scientific discipline.

II. FORENSIC TOXICOLOGY

Forensic science is the application of a broad spectrum of sciences to answer questions of interest to a legal system. This may be in relation to a crime or a civil action. Besides its relevance to a legal system, more generally forensics encompasses the accepted scholarly or scientific methodology and norms under which the facts regarding an event, or an artifact, or some other physical item are ascertained as being the case. In that regard, the concept is related to the notion of authentication, where by an interest outside of a legal form exists in determining whether an object is what it purports to be, or is alleged as being. As it has been noted above that the use of drug has become a significant and social problem in the society therefore the chemical testing of biological specimens from individuals is generally accepted to be the most objective method for determining the drug use. Drug testing with the help of forensic is increasingly used within the criminal justice system to monitor drug use. As such, toxicological analysis represents a tool for assessing the degree of impairment exerted by a drug or combination of drugs. With the ultimate degree of impairment being death, toxicological findings are also used to determine cause and manner of death. Every year many people are found dead in unexplained circumstances: they may be found in bed at home or in hotels, or in squats or on open ground. Evidence found at the scene, such as empty tablet bottles, bottles of alcohol or drug-taking paraphernalia can help to indicate a drug or alcohol-related death. Toxicological analysis can be crucial in determining the cause of death and many such cases are submitted to LGC Forensics from coroners and the police. Suspicious deaths in nursing homes and hospitals are particularly challenging, as the interpretation of high levels of a prescribed drug in an individual with some tolerance to its effects can be complex.

DEATH INVESTIGATION TOXICOLOGY (POSTMORTEM TOXICOLOGY)

Postmortem forensic toxicology involves analyzing body fluids and organs from death cases and interpreting that information. Sudden unexpected and/or unexplained deaths become coroner's cases or fall under the jurisdiction of the medical examiner. Forensic toxicologists work with pathologists, medical examiners in helping to establish the role of alcohol, drugs and poisons in the causation of death.

- ✓ The toxicologist identifies and quantifies the presence of drugs and chemicals in blood and tissue samples. This is done using state of the art chemical and biomedical instrumentation capable of detecting small amounts of toxic materials, positively identifying them, and accurately measuring how much is present.
- ✓ Accuracy, validity and reliability are essential, as this information is used in the determination of cause and manner of death.
- ✓ Accurately establishing the appropriate cause and manner of death has serious implications for public health and public safety, and forensically reliable toxicology is an essential component of that process. Death investigation toxicology is performed by both public and private laboratories and many private forensic laboratories provide specialized expertise and services not available in government laboratories.

HUMAN PERFORMANCE TOXICOLOGY

Human Performance Toxicology deals with the effects of alcohol and drugs on human performance and behavior, and the medico-legal consequences of drug and alcohol use. This may include investigations of impaired driving, vehicular assault and homicide, drug facilitated crimes including sexual

ISSN: 2394-4404

assault, and aircraft, motor vehicle and maritime collision investigations. It can be referred to as behavioral toxicology.

- ✓ Forensic toxicologists perform analysis of drugs and alcohol in biological samples, typically blood and urine, but increasingly in other matrices such as oral fluid, and hair, for the purposes of determining the timing, extent, and impairment resulting from different patterns of drug and alcohol use. The toxicologist uses those analytical methods that are found in many research and hospital laboratories to isolate drugs from complex biological samples, prepare them for analysis through extraction and purification, then determine the identity and amount of drug present.
- ✓ This can include performance enhancement which occurs following the use of stimulants, and impairment from recreational or prescription medication use and misuse.
- ✓ Many blood alcohol and drug testing cases are performed in accredited private or academic forensic toxicology laboratories. Forensic toxicologists frequently testify in court to both their findings and to their interpretation. This type of testing may occur in public crime laboratories, but also may be a function of a health department in some states.

DOPING CONTROL

Governing bodies of most competitive and intramural sports have derived rules regarding performance enhancing drug use to protect the health and welfare of the amateur and professional athletes, to maintain a fair and even competitive standard, and avoid wagering fraud. This applies to both human and animal sports and athletes. International groups such as the International Olympic Committee (IOC), the World Anti-Doping Agency (WADA), and the International Federation of Horseracing Authorities (IFHA) work to update and maintain these lists as patterns of drug use change. Forensic toxicologists in this field use many of the same high performance analytical methods to detect current and historical use of banned substances, including stimulants, anabolic steroids, and diuretics. This type of testing occurs in commercial and public accredited laboratories around the world, though there is also testing of high-school, college and other athletes that occurs in private laboratories.

FORENSIC WORKPLACE DRUG TESTING

Use of drugs by people in the workplace has significant safety and economic consequences. Consequently, in many states, workers in safety sensitive positions are prohibited from using recreational drugs or taking certain medications without a prescription. Particularly, in recent years there has been increased emphasis on testing employees to make sure that they are not using drugs while on the job. This testing started with workers in sensitive situations or those who worked in dangerous environments, such as police officers, locomotive engineers, pilots, etc., but has since spread to many other occupations. However, the testing has to be done through some enforcing standards (that has to be made by legislation through forensic departments) that requires pre-employment, random, and for-cause drug testing, such as following an accident or a transportation collision. The majority of workplace drug testing is not covered directly by accreditation programs hence there are numerous examples of improper procedures and conclusions that have led to the termination of employees based on faulty drug testing.

SAMPLES USED IN TOXICOLOGY STUDIES

URINE

A urine sample is quick and easy for a live subject, and is common among drug testing for employee of athletes. Urine sample do not necessarily reflect the toxic substances unless the subject was influenced by it at the time of the sample collection. Urine is a valuable specimen for both ante mortem and post mortem drug testing because it is a relatively uncomplicated matrix. The amount required for sampling is 50 ml or total amount. It is considered as the best specimen for comprehensive drug and poison screening is urine.

BLOOD

Blood provides unique advantages over other matrices in terms of the wide variety of analytical methodologies available. A blood sample of approximately 10 ml is usually sufficient to screen and confirm most common toxic substances. A blood sample provides the toxicologist with a profile of the substance that the subject was influenced by at the time of collection; for this reason, it is the sample of choice for measuring blood alcohol content in drunken driving cases. For cases of poisoning where gaseous or volatile substances are involved, samples of brain, lungs and blood must be collected immediately using gas-tight containers, and if possible, tarred, cooled glass containers. Maintaining a frozen fraction of blood may help ensure better analyze stability in later re-analyses.

HAIR

Hair has been used in variety of toxicology settings to provides a history of drug exposure and has therefore found applications in workplace drug testing, in monitoring of persons on probation or on parole for drug use, in insurance testing to verify the truthfulness of statements made by applicants relating to whether they use drugs or are smokers, in drug-facilitated sexual assault and in other types of criminal case- work. Hair is capable of recording medium to long-term or high dosage substance abuse. Chemicals in the bloodstream may be transferred to the growing hair and stored in the follicle, providing a rough timeline of drug intake events. However, testing for drugs in hair is not standard throughout the population. For eg- If two people consumed the same amount of drugs, the person with the darker and coarser hair will have more drug in their hair than the lighter haired person when tested. This raises issues of possible racial bias in substance tests with hair samples. Approximately 100-200 mg of hair should be collected from the vertex posterior on the back of the head by cutting as close to the scalp as possible, ensuring that it is clearly marked which end is closest to the scalp and appropriately securing the hair into a bundle with a

rubber band, twist tie, or string. The hair sample may then be placed into aluminum foil, an envelope, or plastic collection tube and stored at room temperature until analysis. Therefore concluding that, hair is considered as one of the most useful specimens for STA, when there has been a significant delay between suspected exposure to a drug or poison and reporting to law enforcement.

ORAL FLUID

The use of oral fluid is gaining importance in forensic toxicology for showing recent drug use, e.g. in clinical settings or investigation of driving under influence of substances. It can be collected non-invasively, conveniently and without invasion of privacy and is most commonly collected fluid from the oral cavity for the determination of drugs22. The use of oral fluid is gaining importance in forensic toxicology for showing recent drug use, e.g. in clinical settings or investigation of driving under influence of substances. It is composed of many things and concentrations of drugs typically parallel to those found in blood. Sometimes referred to as ultra filtrate of blood, it is thought that drugs pass into oral fluid predominantly through a process known as passive diffusion. Drugs and pharmaceuticals that are highly protein bound in blood will have a lower concentration in oral fluid.

VITREOUS HUMOR

It is one of the post-mortem specimens. The availability of autopsy specimens in postmortem toxicology allow for a more flexible analytical approach to the analysis, although some specimens have more value than others when specific drugs or poisons are involved in the death. The fact that vitreous humor resides in an anatomically isolated and protected area of the body (behind the lens of the eye), coupled with its good stability as a biological fluid, makes this specimen more resistant to putrefactive changes than other postmortem specimens. All available vitreous fluid from each eye should be collected separately. Vitreous humor is particularly useful for postmortem analysis of glucose, urea nitrogen, uric acid, creatinine, sodium and chloride. These are important analyses for the evaluation of diabetes, degree of hydration, electrolyte imbalance, postmortem interval and the state of renal function prior to death.

GASTRIC CONTENTS

Gastric content is a potentially valuable specimen for analysis in postmortem and clinical cases. Oral ingestion remains the most popular means of exposure to drugs and poisons. Therefore, gastric contents are essential for screening tests. All of the available sample should be collected without the addition of a preservative. Undigested pills and tablets should be separated and placed into plastic pillboxes for analysis. After opening the abdominal cavity, the stomach should be tied off and then removed, subsequently emptying the contents into a container and documenting the total amount. Suspicious items such as tablet remnants and herbal matter etc. should be isolated, dried (e.g. on cellulose tissue) and stored separately. Gastric contents are non-homogeneous and should be homogenized prior to sampling.

TISSUES

Tissue samples collected in postmortem investigations generally provide supplemental information to the toxicologist to assist in interpretation of their results. In STA, analysis of the correct tissue specimen may be vital to the identification or confirmation of an unknown causative agent. When tissues are sampled they should be collected quickly and placed immediately into airtight containers. Liver, kidney, brain, lung and spleen are the most frequently collected postmortem tissues.

III. OTHER METHODS IN FORENSIC SCIENCE

NARCO-ANALYSIS TEST

Narcosis is a state of stupor induced by drugs. The use of narcotics as a therapeutic aid in psychiatric is believed to have a history dating back to the use of opium for mental disorder by the early Egyptians. Earlier in the 20th Century the medical doctors started to use scopolamine together with morphine and chloroform to induce a state called ‘twilight sleep’ during childbirth as these have the effect of sedative. However, scopolamine was also known to create a state of disorientation, confusion and amnesia during the period of intoxication. Narco-Analysis is a process whereby a subject is put to sleep or put into semisomnolent state by means of chemical injection and was then interrogated while in this dream like state, or the process of injecting a ‘truth serum ‘drug into a patient suspect to induce semi consciousness, and then interrogating the patient /suspect.

This process has been utilized to enhance the memory of a witness. In 1922, Robert House, a Texas based Obstetrician thinking that an alike method may be used to cross-examine the suspects in criminal examinations. For that reason he arranged for two suspected prisoners for investigation who were under trial and whose guilt seemed to be confirmed. Upon such investigation, both the person denied such charges and both on trial were found not to be guilty. This led Robert House to conclude that a person under the effect of scopolamine cannot lie, because there is no reason or power to think. His idea and experiment gained a lot of limelight and attention and therefore led the beginning of Narco-Analysis in criminal investigation.

During the process of Narco-Analysis test a person has no power to think due to the effect of drugs which was injected torn him. His idea and experiment gained a lot of limelight and attention and therefore led the introduction of Narco-Analysis in criminal investigation.

Narco-analysis has witnessed a mixed response from the judiciary, ranging from outright disapproval to reluctant and latent encouragement. For instance, in *Sekharan* v. *State of Kerala*, the Kerala High Court took an acerbic approach towards the process, declaring unequivocally that it is against the fundamental right of an accused. However, during 2004-2009, various High Courts have been relaxed in commenting

on the civil liberties aspect of Narco-Analysis while some have decreed it a permissible practice, in conformity with Part III of the Constitution. Thus the judicial tryst with Narco-Analysis in the previous decade had been one of the ambivalence or approval. The judiciary possibly viewed this practice to be a solution to compare the threat to internal security faced by India during the aforementioned period.

POLYGRAPH OR LIE DETECTOR TEST

The term 'Polygraph literally means 'many writings' therefore the name refers to a process in which selected psychological activities are recorded. The first attempt in this direction was made to expand a scientific instrument to identify reality or fraud as early as 1895 by Lombroso. It was basically designed to record blood pressure and changes in pulse rate. Later Larsen and Keeler designed an instrument which was further developed by John Reid in 1947.The very fundamental principle underlying Polygraph is that when a person lie he becomes nervous, which in turn causes mental excitation. To conceal the excitement which the person attempts, adrenal glands are stimulated to secrete Adrenalin, which on entering the blood stream, sets up the blood pressure and rate of pulse and respiration. All these psychological changes when recorded are collectively called Polygram, which is analysed and evaluate to find out whether during the lie detection test, the subject experienced emotional stress with any of the questions asked.

Such examination is performed on the basis of supposition that there is an intimate contact between mind and body and is performed by different components or the sensors of the Polygraph machine, which are attached to the body of the suspected person's body that is being cross-examined. The principle behind the test is that the suspect fears detection of his/her lie and creates in him/her an emotion of fear which consequently results in psychological changes which are captured by different instrument.

The blood pressure, pulse rate, respiration and muscle movements details etc recorded by the machine. This test is conducted at three stages namely pretest interview, chart recording and diagnosis. The examiners arrange a set of questions which depend upon the relevant information about the case which is provided by the investigation machinists such as the charges against the person and statements made by the suspects. The reaction which occurs during the examination of the suspect is recorded and measured. A baseline is created by the examiner by asking few question answer of which is already known to him. Whether a person is lying or not is recognized by behavioural and psychological changes, which the graph exposes. The sign of lie is derived from the base line. All such evidence is then corroborated with the other evidence collected. Keeler further developed the Polygraph machine by adding psycho-galvanometer, which would record electrical resistance of the skin.

BRAIN MAPPING OR P300 TEST

Dr. Lawrence A. Farwell, Director and Chief scientist of 'Brain Wave Science' IWOA developed this test and patented in the year 1995. He was a well known neurologist. This technique is also known as 'Brain wave finger printing'. In this technique, the suspect is first interviewed and interrogated to find out whether he is concealing any important information. Then sensors are attached to the head and the person is made to sit in front of a computer monitor. He is then shown and made to hear certain images and voice. The sensor attached to head monitors and records electrical activity and P300 waves in the brain, which is produced only if the subject has link with stimulus. The subject is not asked any question. To put it simply, it simply means that brain finger printing matches the information stored in the brain with that of the related crime and crime scene. In case of an innocent person no such P300 waves would get registered during the test.

In India, the first Forensic laboratory which used this technique is Forensic laboratory of Bangalore. Proof produced by Expert in a criminal trial would be just a fraction of the totality of the evidence on the appreciation of which the judge or jury takes judgment. The Court takes into account all the other proofs at hand along with the view of the scientific expert, which is just one piece of evidence needed to be taken into consideration and appreciated for its evidentiary value. Even after the validity of the technique of brain fingerprinting satisfies Daubert's criteria, its application as a forensic tool in individual cases will depend upon the genuineness of the investigation and other factors. The test would not be applicable in a case in which two suspects in an investigation were both present at a crime, but one was a witness and the other a perpetrator. The method can only detect information from their memory that would place both at the scene of the crime and it cannot decide what their roles were, thereby creating a distinct possibility of an innocent eye-witness becoming a suspect of the crime and giving a dubious opportunity to the real culprit to create a situation of doubt. Moreover, the method would not be definitive in a case in which investigators do not have sufficient information about a crime to be able to test a suspect for crime-relevant information stored in the brain. The brainfingerprinting analysis identifies the existence or nonexistence of information and not the guilt or innocence per se. In few cases, a person may possess virtually all the available information about a crime, although he is not a perpetrator. In such cases, possessing relevant information with respect to crime will not recognize that individual as the perpetrator and the test cannot be applied to solve the case. The heuristics proposed consists of five basic parts and emphasizes the underlying principles common to all fields of science. It is suggested by the author that the judges and the lawyers who assist them about their cases, must be able to do five things: (i) Identify and examine the proffered theory and hypothesis for their power to explain the data; (ii) Examine the data that supports (and undermines) the expert's theory; (iii) Use supportable assumptions to fill the inevitable gaps between data and theory; (iv) Examine the methodology; and (v) Engage in probabilistic assessment of the link between the data and the hypothesis.

ISSN: 2394-4404

IV. FORENSIC SCIENCE AND CRIME INVESTIGATION

Forensic Science and Criminal Prosecution Scene of Occurrence:

A scene of occurrence can be defined as the meeting place of the persons involved in the crime. Traces are exchanged by the parties amongst themselves and with the scene, leaving odds and ends and mark of tools, wearing apparels, and means of transport, hands and feet. Thus, the scene of occurrence provides a wealth of information which is useful to:

- ✓ Establish corpus delicti.
- ✓ Provide link between the criminal, the victim and the scene of occurrence; and
- ✓ Evaluate the pattern of events.

Except in the cases of forgery is less important due to limited utility, the scene is of great importance in almost all crimes. Planning, care and diligence are required in the examination of the scene. The success or failure of the investigation in many cases depends entirely upon the proper handling of the scene. The scene of occurrence cannot be preserved forever and changes rapidly. Some of the evidence gets lost soon after the occurrence; the other evidence disappears, gets contaminated or altered with further passage of time. The opportunity to examine the scene is available only once. If the same is not fully exploited the wealth of information is lost forever.

In Marachalil Chandra Tukaram Talekar v. State of Gujarat, it was argued with great vehemence in the High Court as well as in the court of sessions that there was trial of blood from the front door of the house of the vakil into the corridor rooms marked H and H-1 in the plan and that supported the defense theory that the deceased Kannan received the stab injuries not in or near the house in question but somewhere far away near the railway station. The High Court took the view that if Kannan had received the injuries somewhere outside the house it was impossible for him to have come into the room in view of the doctor's evidence. It was concluded on the material placed on the record that there could be no room for doubt that Kannan received the injuries in the room itself and not outside, and that he was carried out of the room while life was still lingering and therefore, there would be dripping of the blood from the body during the course of transit as the injuries were very serious and vital arteries had been cut. Fingerprints:

The identification of criminals through fingerprints was the first important break-through in the scientific investigation of crime. As usual, the judiciary and the public took some time to believe in the utility of fingerprints as a scientific aid. The same is now recognized throughout the world. The importance of fingerprints in criminal investigation is immense, because they are: Unique Ridge pattern of each finger has individuality. The patterns vary not only from one individual to another, but they are different in the same individual on each finger. Duplication of pattern has never been observed. Nor the same is expected. Permanent: The fingerprints of an individual do not change throughout his life. In fact, the ridges appear before birth. They start appearing during third or fourth month of pregnancy. They remain even after the death of the individual ever till the epidermal skin is destroyed by fire, putrefaction or is eaten by insects or other creatures. In a murder case the body of the victim was partially burnt and buried. The same was discovered many days after the murder. The body was completely disfigured and could not be identified. The investigating officer got removed the remaining skin pieces from the tips of the fingers through a doctor. He sent them to fingerprint bureau along with the one authentic print of the deceased available on his will. The bureau confirmed the identity of the deceased. The digital skin pieces were recovered and sent to the finger print bureau. The fingerprints of the deceased tallied with the fingerprints of the convict, available in the records, the permanence of fingerprints permits identification of an individual even after many years, if his finger print record is available. Many criminals have been identified through this medium after years of absconding. Universal All individuals and hence all criminals carry this medium of identification. The finger digits and surface of the hands carry the friction ridges. The fingers have more intricate patterns. They allow easier individualization and classification. A criminal uses his hands in the commission of crime. He leaves marks at the scene of occurrence or on the objects which come in contact in the commission of crime. There are fair chances of occurrence of finger prints, therefore in all types of crime. Inimitable

Successful forgery of fingerprints has not been reported so far. Near perfect forgeries have been attempted. It is possible that the advancement of science may bring the forgery still closer to perfection but complete success in the enterprise is extremely difficult, if not impossible. For all practical purposes it may be taken that it is not possible to forge a fingerprint. This is important because no person can deny his or her fingerprints. The identification through fingerprints is certain and infallible.

In Bazari Hajam v. King Emperor, the question arose whether it will be safe to act on the uncorroborated testimony of the fingerprints and declare the guilt of the accused. On this point Bucknill, J., observed thus: ―I think that apart from the fact that I should be rather sorry without any corroborative circumstances to convict a person of a serious crime solely and entirely upon similarity of thumb marks or finger prints, the very fact of the taking of a thumb-impression from an accused person for the purpose of possible manufacture of the evidence by which he could be incriminated is in itself sufficient to warrant one in setting aside the conviction upon the understanding and upon the assumption that such was not really a fair trial."

The above view was disapproved of by Schwabe, C.J. in Public Prosecutor v. Kandasami Thevan although the point did not directly arise in the case as there were thumb-impressions of the accused in evidence other than that taken by the judge in court for comparison with the thumb-impressions in the document alleged to have been forged. Track Marks:

The culprit approaches, stays and then leaves the scene of occurrence. He leaves track marks on and around the place in the form of prints and impressions (collectively called ―marks‖) of feet, shoes, tyres, hoofs and the like. The evidence often connects the criminal with the crime conclusively. It should, therefore be properly understood, collected, evaluated and presented in the courts. The track marks establish not only the presence of the culprit at the scene of crime but also give the number of participants. The

ISSN: 2394-4404

evidence is helpful in tracking down the criminals to their houses or hide-outs, especially in India where most of the people live in rural areas. The roads in the country side are not metal led. Besides, the criminal, ordinarily, follows untraded routes; fields, garden and stream beds. He leaves track marks on routes used before and after the commission of the crime. The nature of the vehicle used in the commission of crime whether it is a cycle, scooter, car, bus, truck, tractor, rickshaw, bullock cart or a buggie can be ascertained. It is sometimes possible to identify the individual vehicle also. In some cases animals are involved in crimes sometimes. For example, a horse or a camel may be used for transport; a cow, a buffalo or a bullock may be stolen or a dog or a tamed wild best, like a snake or a tiger may be used to destroy or kill a human-being or a domestic animal. The type of the animal or the beast can be found out from the track marks. Foot Wear marks includes the marks of shoes, sandals, chappals, socks and the like. The footwear may be factory- made or hand made.

Rejecting the contention that the study of footprints is not a science in Din Muhammad v. Emperor, the court of the Judicial Commissioner at Nagpur (H.J. Stanyon and H.F. Halifax, A.J. Cs) as far back as in1914 held: ―The knowledge of footprints has similarly been systematized and pursued by trackers , mainly uncivilized and ignorant people an all other respects, all over the world . The matter is therefore undoubtedly a science and the opinion of a person especially skilled in it is a relevant fact, under Sec- 45 of the Evidence Act‖. Necessity of application of Forensic Science

In criminal investigation, use of forensic science is the need of the modern times. In India, the investigation of crime and prosecution of persons having committed the crime are not up to the mark. Even in heinous crimes large number of criminals could not be prosecuted and a few percentage of trials end in acquittal as a result of which number of criminals and crimes are increasing day- to- day. These frequent acquittals are mainly due to obsolete techniques of investigation which leave many loopholes. Thus, for effective investigation scientific ways of investigation is not necessary. The ―third degree‖ methods used by the investigating agencies in British period are not accepted by the new generation of Criminal Investigating Agencies, judges and public at large. Third degree methods for making confession have not completely vanished but their misuse has increased and to control over this issue, the Human Rights Commissions has been established in India and all over the world. Hence, modern scientific methods for investigation of crimes and connecting the criminals with the overt acts are very much necessary in order to make effective the Criminal Justice System.

Cases Solved using Forensic Science

Vasu v. Santha In the above cases the court has laid down certain guidelines regarding DNA tests and their admissibility to prove parentage.

- ✓ That courts in India cannot order blood test as a matter of course;
- ✓ Wherever applications are made for such prayers in order to have roving inquiry, the Forensic evidences in Criminal Trial: Need of the Hour prayer for blood test cannot be entertained
- ✓ There must be a strong prima facie case in that the husband must establish non-access in order to dispel the presumption arising under Section 112 of the Evidence Act.
- ✓ The court must carefully examine as to what would be the consequence of ordering the blood test; whether it will have the effect of branding a child as a bastard and the mother as an unchaste woman.
- ✓ No one can be compelled to give sample of blood for analysis. Further the court said Blood-grouping test is a useful test to determine the question of disputed paternity. It can be relied upon by courts as a circumstantial evidence, which ultimately excludes a certain individual as a father of the child. However, it requires to be carefully noted no person can be compelled to give sample of blood for analysis against his/her will and no adverse inference can be drawn against him/her for this refusal.

Tandoor Murder Case (1995) Delhi: This was the first criminal case in India solved by the help of forensics. In this case Shusil Sharma murdered his wife at home by firing three bullets in to his wife Naina Sahni‘s body. He killed his wife believing that she had her love affair with her classmate and fellow congress worker Matloob Karim. After murdering his wife Sharma took her body in his car to the Bagiya restaurant, where he and restaurant manager Keshav Kumar attempted to burn her in a tandoor there. Police recovered Sharma‘s revolver and blood-stained clothes and sent them to Lodhi Road forensic laboratory. They also took blood sample of Sahni's parents, Harbhajan Singh and Jaswant Kaur and sent them to Hyderabad for a DNA test. According to the lab report, "Blood sample preserved by the doctor while conducting the post mortem and the blood stains on two leads recovered from the skull and the neck of the body of deceased Naina are of 'B' blood group." Confirming that the body was that of Sahni, the DNA report said, "The tests prove beyond any reasonable doubt that the charred body is that of Naina Sahni who is the biological offspring of Mr. Harbhajan Singh and Jaswant Kaur." And finally Mr. Shusil Sharma was found guilty with the help of forensic evidences.

In Krishan v. State of Haryana, the Trial Court, considering the facts and circumstances of the case, more particularly relying on the FSL report convicted the appellant under Sec. 376 and Sec.506 of IPC.

In the case of State of Gujarat v. Mohan Hamir Gohil and others, Division Bench of this Court after referring to various authorities on DNA technology, different methodology used for testing and the scientific advancements made world over, noticed that over a period of time the Courts across the world including in India have been placing heavy reliance on DNA results. It was observed " Over a period, the technology of DNA testing has made great strides and achieved sophistication leading to results which can often times be used either for inclusion or exclusion of the accused. DNA of a person is considered R/CR.A/224/2012 JUDGMENT unique to himself (except in cases of identical twins) and can be traced from smallest quantity of blood, saliva, semen, root of hair, skin, nail and such like. Subject, of course, to the laboratory analyzing the sample following the scientific

protocols, the DNA results becomes absolutely unquestionable.

In Dharam Deo Yadav v. State of Uttar Pradesh, a judgment which deals with the admissibility of DNA evidence, Supreme Court observes that "Crime scene has to be scientifically dealt with without any error. In criminal cases specifically based on circumstantial evidence, forensic science plays a pivotal role, which may assist in establishing the evidence of crime, identifying the suspect, ascertaining the guilt or innocence of the accused. One of the major activities of the investigating officer at the crime scene is to make thorough search for potential evidence that have probative value in the crime. Investigating Officer may be guarded against potential contamination of physical evidence which can grow at the crime scene during collection, packing and forwarding. Proper precaution has to be taken to preserve evidence and also against any attempt to tamper with the material or causing any contamination or damage."

In Anil @ Anthony Arikswamy Joseph v. State of Maharastra, relying on scientific evidences including DNA profile and oral evidences, the accused was convicted and punished with death sentence and fine by the Sessions Judge, Nagpur for gruesome murder of a minor boy aged about 10 years after subjecting him to carnal intercourse and then strangulating him to death.

In Nitish Katara murder case, the identification of the deceased victim was difficult due to availability of only a small portion of one un-burnt palm with fingers. Here also, DNA profile helped in identifying the body remains by matching DNA profile with parents of the deceased which helped the High Court of Delhi to uphold the conviction of the accused.

In Sushil Mandal v. The State represented by CBI, the petitioner, father of the deceased boy, challenged the findings of DNA profiling. The deceased boy fell in the adolescent cusp of mutual infatuation with a school girl and parents of both were advised by school administration for keeping check on them. Later, the boy was found reportedly missing and, after a week, a fully decomposed unidentified body was fished out from a lake. The petitioner claimed of not identifying the body remains and clothes of his missing son. He preferred habeas corpus petition in the high court accusing the father of the girl and praying the high court for directing the investigation by the Central Bureau of Investigation (CBI). The DNA test of the body remains matched with the genetic profiles of the parents (the petitioner and his wife) of the deceased. The skull super imposition test also established link between the deceased and the recovered body. But petitioner refused to accept the truth revealed by these scientific tests on one pretext or the other despite the fact that DNA test was repeated for his satisfaction. The apex court placed reliance on scientific tests including DNA profiling for human identification and accordingly closed the matter.

The Bombay High Court in Anmolsingh Swarnsingh Jabbal v. The State of Maharastra, upheld life term, relying upon DNA evidence, in addition to other evidences, for murder of a young lady engineer by her colleague in a case of one sided love. In another case of brutal rape and unnatural sexual act with a four year old girl child living in a slum dwelling was investigated by Delhi police and DNA profiling was used to link the perpetrator with the ghastly act of sexual violence. The court after having examined the detailed analysis of the child's testimony and various methodologies involved therein approved the investigation findings based upon DNA reports and other evidences and held the accused guilty and set aside acquittal order passed by the trial court.

In another case, the use of DNA technology paved the way to prosecute and convict the culprit to death, liable for kidnapping and killing after gang rape of a 10 year old school girl by auto rickshaw driver and throwing the corpse of the victim in a running canal.

V. CONCLUSION

The operation of forensic science is nothing but the application of techniques and methods of basic science techniques and methods of basic science for different analyses of different crimes. Since its beginning, the scientists of the Forensic Science Laboratory, Assam have been rendering invaluable service to the investigating agencies in various ways for the cause of justice. The scientific examinations of a forensic scientist adjoins a missing link or strengthens the investigation by furnishing an impartial evidence, thus helping the courts to come to a conclusion regarding the criminals and their punishments. The field of study or examination of forensic scientist is very wide, diversible and unpredictable. Generally the duties and responsibilities of forensic scientists are very hazardous, onerous and risk bearing too. Because they are to deal with the material exhibits pertaining to various nature of crimes such as murder, rape, blood, saliva, firearms, ammunitions, explosives, and explosives substances, liquor, hashish, opium, adulterated petrol, kerosene, diesel, etc. and other chemical vehicles involved in accidents, various types of paints. Weapons used in burglary, arson, etc. different types of poisons and poisons and poisonous substances, hair, skeletal remains and other plant or animal remnants. Apart from these, forensic scientists also examine the forged signatures and documents along with the photographic analysis of all materials exhibits. Any material exhibit encountered in the way of investigation needs to be thoroughly examined to prove or disprove its association with a particular crime or criminal. Practically the forensic scientists are to examine the material exhibits connected with various nature of crimes covering the sections of Indian Penal Code and other relevant Acts and the laws of the land. Unlike other research and analytical materials, forensic scientists are required to work with limited quantity and amount of materials generally left behind or carried away by criminals.

Crime is as old as the human civilization. Likewise also the conviction of the wrongdoer and punishment in one form or the other also existed in society. After the enactment of various laws, the criminals are put on trial, in the courts of law for establishment guilt or innocence of a person. The guilty persons are non convicted by the courts and punished for their acts. The traditional methods have not proved very fruitful in attaining the required conviction rate. In recent years, due to the application of knowledge and techniques of forensic science, there has been relatively higher increase in the conviction of various crimes but still the conviction rate is not

in balance with the crimes committed. Forensic Science in the investigation of crime and in the administration justice is surely a versatile tool. Forensic Science can be defined as Criminalistic science. In other words, the scientific studies or investigation of crime can be termed as Forensic Science. Along with the development of science and technology the pattern of our society has also changed to cope with the day to day development. Accordingly the criminal also often uses different techniques for the commission of various crimes within our society. So it has become a problem for the law enforcing agencies to check the potentiality of crimes. For such checking, the need of forensic science becomes an essential prerequisite on the part of the investigative agencies.

REFERENCES

[1] H.J. Walls, Forensic science (Universal Law Publishing Pvt Ltd, New Delhi,1st edition reprint.,2002)
[2] B.S. Nabar, Forensic Science in Crime Investigation (Asia Law House Hyderabad< 3rd edition.,2008)
[3] B.R. Sharma, Forensic Science in Criminal Investigation and Trials (Universal law Publishing Pvt Ltd, 3rd edition., 1999)
[4] D. K. Molina, Handbook of Forensic Toxicology for Medical Examiners 10-11 (CRC publications, New York., 2012)
[5] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3171915/
[6] https://mha.gov.in/sites/upload_files/mha/files/pdf/DraftPolicyPaperAug.pdf.
[7] https://www.britannica.com/topic/crime-law/Detection-of-crime
[8] AIR 2014 SC 895
[9] (2013) 14 SCC 24
[10] (2014) 5SCC 509
[11] (2004) 1 All MR (Cri) 67
[12] 2006 CriLJ 2401
[13] 2010, 7SCC, 263
[14] JT2014(3) SC217
[15] 2013 JX(GUJ) 687
[16] AIR 1923 Pat. 73
[17] AIR 1959 Mad 333
[18] AIR 1940 Lah 129